User Feedback for Serval’s TLUD Biomass Gasifier Cookstoves from Sunderbans (West Bengal, India)

Serval’s, Sapient
June, 2012
This Report
... A Quick Overview

- This is a report based on User Feedback
  - On the Servals TLUD Biomass Gasifier Cookstove.
  - From a sample of 50 households.
  - From the community of Sunderbans, West Bengal, India.
  - Conducted in May 2012.
  - By Servals, Chennai, India and Sapient, Kolkata, India.

- This report covers the following
  - An overview of Servals, Sapient, TLUD, Sunderbans.
  - Quantitative and Qualitative feedback from the 50 users from the pilot community in Sunderbans.
# Structure of the Report

- Describing the “Stage”

| The Players       | S服役als – Technology Partner  
                      Sapient – Implementation Partner with Mass Education as the Field Partner |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>The Product</td>
<td>S服役als TLUD Biomass Gasifier Cookstove</td>
</tr>
<tr>
<td>The Community</td>
<td>Sunderbans</td>
</tr>
<tr>
<td>Putting it together</td>
<td>Roles, Responsibilities of the stakeholders</td>
</tr>
</tbody>
</table>

- Pilot Results

  - Overall Measures (Satisfaction, Loyalty, Advocacy)
  - Satisfaction with specific dimensions (Product, usage, Fuelwood procurement)
  - Comparison with old cookstove
  - Summary

- Annexures (provided as a separate report)

  - Detailed write-up on S服役als, Sapient, TLUD, Sunderbans
  - Video footage and photos shot during the pilot
Describing the “Stage”

- Brief Introductions
  - Serval, Sapient
  - TLUD, Sunderbans

in pursuit of sustainable rural energy products
Serval – A Quick Overview

...The Technology Partner

- Serval Automation Pvt Ltd (Serval)
  - Social enterprise based in Chennai, India.
  - Focuses on providing clean, green, affordable and sustainable energy for cooking purposes.

- Some Notable achievements
  - Winner of the Sankalp 2010 Award in “Clean Energy Sector” for TLUD.
  - Nominated as a World Economic Forum Technology Pioneer Candidate 2011.
  - One of the 8 companies identified by InfoDev (a program of the World Bank) as leading the technological innovation for climate change.
  - Winner of the L-Ramp Innovation Award for "Award of Excellence - Enterprise Category – 2007".
  - Certified as a B-Corp; only the second in India, Recognized as part of a global movement of companies using the power of business to solve social and environmental problems.

- A more detailed writeup provided in the annexures - Team, Board of Investors (Aavishkar (India), ERM (UK), GBF(USA), Business model)
Sapient – A Quick Overview
...The Implementation Partner

- Sapient Infotech (Sapient)
  - Based in Kolkotta, India
  - Promoted by Mr. Moulindu Banerjee - a marketing entrepreneur with 20 years experience
  - A proprietorship concern operating in the area of Management Consultancy

- Some Notable Achievements
  - Mr. Banerjee, part of the core team that developed the “Consumer Connect Programme” in Unilever. This programme was designed to reach end consumers in person to understand the consumer's latent needs in urban and rural areas of India.
  - Winner of Chairman's Award for 2 consecutive years for this programme.
  - Sapient has set up a distribution system in West Bengal for Onward Mobility, world's first offline mobile applications seller.

- A more detailed writeup is provided in Annexure
  - Profile of work
  - Profile of the promoter
Mass Education – A Quick Overview
...The Field Partner

- Mass Education (http://mass-education.com/) is a 30 year old International NGO based in Kolkotta with mandates towards
  - Formulating integrated programmes for effective mobilisation of human and natural resources for empowerment of the poor
  - Creating awareness and opportunities for providing basic human rights (education, women empowerment, health, livelihood, social forestry etc)
  - Execution of development projects (National and International)

- Mass Education actively works in Sunderbans in 1105 villages (70,000 households)
  - Have agreed to be Sapient’s Field Partner in all these villages.
Servals TLUD Biomass Gasifier Cookstove – A Quick Overview

- TLUD stands for Top Lit Up Draft.
- Most cook stoves are Bottom Lit Up Draft.
- TLUD technology is pursued around the world since it saves fuel.
- is a stove with a canister
- which when filled with fuel (any Dry Biomass waste like twigs, coconut husks, cow dung, Carpentry waste, etc) and combusted,
- will enable cooking for an average of 30 minutes depending on fuel type
- and produces precious charcoal at the end; can be used for various commercial applications.
Sunderbans – A Quick Snapshot

• Spanning 355 km in width is the largest mangrove forest in the world
  • at the mouth of the Ganges; spread across Bangladesh and West Bengal, India.
  • Indian side Sundarbans located within 24-Parganas Districts of West Bengal
  • typical specimen of new deltaic formation; exhibits the process of landmaking in an unfinished state, and presents the last stage in the life of a great river – the stage in which it emerges through a region of half land, half water, almost imperceptibly, into the sea” (O'Malley, 1914/98; p.2).

• One of the last tropical deltaic mangrove forests in Asia
  – the rest have succumbed (to paddy fields aquaculture)

• Has the distinction of being the first mangrove forest in the world where scientific management of resources was practiced

• Indian portion of the forest are listed in the UNESCO world heritage list as Sundarbans National Park

• Uncleared forest declared as “reserved” or “protected” in 1878
Sunderbans – A Quick Snapshot

• Presents an excellent example of ongoing ecological processes.
  — Complex network of tidal waterways, mudflats and islets of salt-tolerant mangrove forests.
  — Known for its wide range of fauna; most famous being the Bengal Tiger.

• For three quarters of the nineteenth century the Sundarbans witnessed a constant assault on the ecosystem.

• It has been said that the supply is inexhaustible, but such is not the case. It appears, on the contrary, that the western part of the Sundarbans, which is that nearest to Calcutta, is already exhausted to a large extent, and that fuel-cutters proceed more to the east year after year” (as cited by Tikader, 1983; p.43).
## Sunderbans – A Quick Snapshot

### Demographic profile

<table>
<thead>
<tr>
<th>Population as per 2011 Census</th>
<th>4.5 Million; Avg family size 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of Households</td>
<td>87,000</td>
</tr>
<tr>
<td>No. of blocks</td>
<td>216</td>
</tr>
<tr>
<td>No. of Villages</td>
<td>1446</td>
</tr>
<tr>
<td>No. of accessible households</td>
<td>70,000</td>
</tr>
<tr>
<td></td>
<td>The rest are in remote hamlets which remain cut off from mainland during low tide</td>
</tr>
</tbody>
</table>

- The main mode of transport is mechanized boats as the communities live in back waters; Very poor road communication exist but is not popularly used.

- Supply of essentials is a big issue and the populace irrespective of their economic status are forced to use fuel wood as main cooking fuel.
Sunderbans – A Quick Snapshot
- Demographic profile -

- Over 60% of the population in this region will fall Below the Poverty Line. The main sources of income are from:
  - Fishing - around 45%
  - Crop farming - around 20%
  - Honey framing - around 25%
  - Small business - around 15%

- The area being a busy tourist location there exists quite a number of small business establishments mainly small eateries who cater to the local tourists at low cost. These eateries also consume a lot of fire wood for their business purpose.
**Putting it together for the Carbon Finance Project**

<table>
<thead>
<tr>
<th>Key Stakeholder</th>
<th>Role</th>
<th>Responsibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Servals</td>
<td>Technology and Product Partner</td>
<td>• Provide Technology Literature, documentation as needed&lt;br&gt;• Produce and offer TLUDs to community</td>
</tr>
<tr>
<td>Sapient</td>
<td>Implementation Partner</td>
<td>• Place stoves in the community&lt;br&gt;• Through a core team of 10 women (already identified) guiding a larger team of 150 project partners (all women; already identified)&lt;br&gt;• Maintain required administrative work required for the project&lt;br&gt;• Submit monitoring surveys</td>
</tr>
<tr>
<td>Mass Education</td>
<td>Field Partner</td>
<td>• Enable reach to 1105 villages&lt;br&gt;• Organize demos and reach out to remote communities&lt;br&gt;• Offer 5 locations as warehouses and distribution points&lt;br&gt;• Offer manpower resource pool for “Rural energy entrepreneurs”&lt;br&gt;• Design impactful programs for children education, women livelihood and health (IAP, low smoke)</td>
</tr>
</tbody>
</table>
### Putting it all together for the Carbon Finance Project

<table>
<thead>
<tr>
<th>Key Stakeholder</th>
<th>Role</th>
<th>Responsibilities</th>
</tr>
</thead>
</table>
| Rural Energy Entrepreneurs    | “Feet of the Street”        | • Installing the TLUDs  
• Be responsible for 40-50 household clusters (demos, maintenance, first escalation point etc)  
• Do data collection for monitoring survey |
| Community                     | Beneficiary                 | • Pay the agreed upon price for the TLUD  
• Co-operate during monitoring survey |

- A Brief profile of the 150 “Rural Energy Entrepreneurs”
  - Mostly women; Social workers drawn from the Mass Education pool; some educated unemployed rural youth as well.
  - Each Associate will be responsible for around 40-50 household clusters.
Pilot Study Results

<table>
<thead>
<tr>
<th>Section 1</th>
<th>Overall Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Section 2</td>
<td>Specific Parameters</td>
</tr>
<tr>
<td>Section 3</td>
<td>TLUD Vs Old Stove</td>
</tr>
<tr>
<td>Section 4</td>
<td>Summary</td>
</tr>
</tbody>
</table>
Objective

To gauge “User Acceptance” for the TLUDs in Sunderbans

With a view to assess the possibility of setting up a project aided by carbon subsidy

- In Sunderbans
- Around Serval’s TLUD Biomass Gasifier Cookstoves
- With Serval’s-Sapient-Mass Education as the Technology-Implementation-Field Partners respectively
50 TLUDs Placed
Baseline fuel wood consumption data collected
(Apr 25 – 28)

4 weeks of Usage

Final Questionnaire
administrated
(May 25 – 27)

Photos (91 photos) and videos (8 clips) available

Data file, analysis file, verbatim file available

Photo ids collected (voter id)

Pilot Report
Research Process
... some visuals

Demo of TLUD at the Mass Education Venue

The “road” to Sunderbans

Pilot Placements
Profile of the Sample

- Response Rate: 94% (47 out of 50 responded; 3 were out of station); 89% of the respondents were female (42 out of 47)

- Have you been using the Serval's TLUD since the day you got it? (N = 47)

<table>
<thead>
<tr>
<th>Response</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes, Everyday</td>
<td>83%</td>
</tr>
<tr>
<td>Yes, but not everyday, but more than 20 days</td>
<td>13%</td>
</tr>
<tr>
<td>Have not used it for more than 5 times</td>
<td>4%</td>
</tr>
</tbody>
</table>

- How many times do you cook in a day (N = 45)

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Twice</td>
<td>96%</td>
</tr>
<tr>
<td>More than twice</td>
<td>4%</td>
</tr>
</tbody>
</table>

- What kind of food do you prepare? (N = 45)

Rice, Dal, Vegetables, Fish, Meat, Fries
Section 1: - Overall Measures -

- Overall Satisfaction
- Loyalty
- Advocacy
- Reasons for Satisfaction/Dissatisfaction
Satisfaction with Servals TLUD
- Overall Measures -

Overall how satisfied are you with the Servals TLUD: 96%
Likely to continue using it: 96%
Likely to recommend it to others: 98%

Pulse Check: Delight, Excitement, Endorsement
Overall Measures
... some diagnosis

- **Reasons for Overall Satisfaction/ Loyalty / Advocacy**

<table>
<thead>
<tr>
<th>Almost all of them said...</th>
<th>... and some others’ comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uses much less fuel</td>
<td>No need to monitor flame</td>
</tr>
<tr>
<td>Low smoke</td>
<td>Can do other work while cooking</td>
</tr>
<tr>
<td>Faster cooking</td>
<td>It is like using gas</td>
</tr>
<tr>
<td>Saves cost</td>
<td>Can cook indoors</td>
</tr>
<tr>
<td></td>
<td>Convenient to use</td>
</tr>
</tbody>
</table>

- **Reasons for advocacy**

  - Good product for poor people
  - Want my friends to experience this
  - Very useful thing for poor people; cooking at low cost

- **Reasons for Dissatisfaction**

  - Too many people in my household; Need to cook 5 kgs of rice; not big enough for larger families
### How the Serval TLUD was used

- **How many times did you cook with the TLUD in a day?** (N=44)
  - Twice: 100%

- **Do you cook indoors or outdoors with the TLUD?** (N=44)
  - Indoors: 100%

- **What starter material did you use?** (N=44)
  - Kerosene: 100%

- **How many times did you fill up the canister per cooking session?** (n=41)
<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Twice</td>
<td>12%</td>
</tr>
<tr>
<td>Thrice</td>
<td>59%</td>
</tr>
<tr>
<td>Four Times</td>
<td>27%</td>
</tr>
<tr>
<td>Five times</td>
<td>2%</td>
</tr>
</tbody>
</table>
How the Serval's TLUD was used

- What is the diameter of the cooking vessel that you normally use? (n = 43)

<table>
<thead>
<tr>
<th>Diameter</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>7&quot;</td>
<td>2%</td>
</tr>
<tr>
<td>8&quot;</td>
<td>21%</td>
</tr>
<tr>
<td>9&quot;</td>
<td>53%</td>
</tr>
<tr>
<td>10&quot;</td>
<td>26%</td>
</tr>
<tr>
<td>11&quot;</td>
<td>51%</td>
</tr>
<tr>
<td>12&quot;</td>
<td>30%</td>
</tr>
<tr>
<td>13&quot;</td>
<td>2%</td>
</tr>
<tr>
<td>14&quot;</td>
<td>70%</td>
</tr>
<tr>
<td>15&quot;</td>
<td>21%</td>
</tr>
<tr>
<td>16&quot;</td>
<td>9%</td>
</tr>
<tr>
<td>18&quot;</td>
<td>2%</td>
</tr>
<tr>
<td>21&quot;</td>
<td>2%</td>
</tr>
</tbody>
</table>
Section 2:
- Satisfaction with specific dimensions-

-Product Parameters
-Usage Parameters
-Fuelwood procurement Parameters
-- some diagnosis
Satisfaction with Serval's TLUD …Product Parameters

- **Ease of Use**: 100% Sat, 0% Dissat
- **Ease of Maintenance**: 100% Sat, 0% Dissat
- **Durability**: 100% Sat, 0% Dissat
- **Ability to withstand rough handing**: 100% Sat, 0% Dissat
- **Ease of working with the flame (starting it, controlling the flame, extinguishing the flame etc)**: 100% Sat, 0% Dissat

*N = 44*
Satisfaction with Serval's TLUD

...Usage Parameters

N = 44

Delivering Convenience

- Ability to cater to my cooking requirements: 100% Sat, 0% Dissat
- Provides adequate cooking duration: 100% Sat, 0% Dissat
- Provides adequate flame power: 100% Sat, 0% Dissat
- Reduces smoke: 100% Sat, 0% Dissat
- Enables faster cooking: 100% Sat, 0% Dissat
- Frees up time for other activities: 100% Sat, 0% Dissat
- Does not require constant supervision: 100% Sat, 0% Dissat
- TLUD being suitable to all my cooking vessels: 100% Sat, 0% Dissat
Servals TLUD in Use at Sunderbans
Satisfaction with Serval’s TLUD

Fuelwood Parameters

- Ease of availability of firewood for TLUD: 98% satisfaction, 2% dissatisfaction
- Ease of breaking fuelwood into canister-sized bits: 98% satisfaction, 2% dissatisfaction
- Reduces time taken to gather fuelwood: 100% satisfaction
- Reduces the consumption of fuelwood: 100% satisfaction
- Reduces cost of fuelwood: 100% satisfaction

Delivering Value
Fuelwood Procurement
... some diagnostics

- How do you procure the fuelwood that you use for cooking with TLUD? (n=42)

<table>
<thead>
<tr>
<th>Method</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buy it</td>
<td>48%</td>
</tr>
<tr>
<td>Collect it</td>
<td>52%</td>
</tr>
</tbody>
</table>

- Who collects the firewood for TLUD? How much time is spent in collection in a week?

  Fuelwood is collected by Women and children
  On an average, 5-6 hours per week

- The data is showing a trend that there is a difference in feedback between people who “buy” fuelwood Vs. people who “collect” fuelwood; but the sample sizes are not adequate to report conclusive findings.

  Indicates a community that is 100% dependent on biomass for cooking
Fuelwood Sizing
... some diagnostics

- How much time, per day, does it take to break the fuelwood into smaller bits?

<table>
<thead>
<tr>
<th></th>
<th>Overall (N = 42)</th>
<th>Those who “buy” fuelwood (N = 20)</th>
<th>Those who “collect” fuelwood (N = 22)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 mins</td>
<td>17%</td>
<td>15%</td>
<td>18%</td>
</tr>
<tr>
<td>15 mins</td>
<td>60%</td>
<td>75%</td>
<td>45%</td>
</tr>
<tr>
<td>20 mins</td>
<td>21%</td>
<td>10%</td>
<td>32%</td>
</tr>
</tbody>
</table>

- What do you use to break down the fuelwood into smaller pieces? (N = 42)

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>“Katara”</td>
<td>100%</td>
</tr>
</tbody>
</table>

Not calling for a change in current practices
Fuelwood Sizing
... some diagnostics

Women Sizing wood using a “Katara”
Fuelwood Saving

...Perception

Do you observe a reduction in your consumption of fuelwood after using the fuelwood? (N= 42)

<table>
<thead>
<tr>
<th>Consumption Level</th>
<th>Overall (N=42)</th>
<th>“Buy” (N=20)</th>
<th>“Collect” (N=22)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I use the same amount as before</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>I use a little less than before (Less than 25% reduction)</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>I use about half of what I used before (about 50%)</td>
<td>86%</td>
<td>90%</td>
<td>82%</td>
</tr>
<tr>
<td>I use much less – even less than half (about 75%)</td>
<td>14%</td>
<td>10%</td>
<td>18%</td>
</tr>
</tbody>
</table>

Strong Value Perception
Suitability to Cooking
... Some diagnostics

- What purposes do you find it useful for?
  - Almost all of them said “All kinds of cooking”
  - Able to cook rice/dal/vegetables/fish/meat/fries well

- What purposes do you not find it useful for?
  - Only one household said “Cannot make rotis (Indian bread); gets burnt”

A predominantly “wet cooking” culinary culture; TLUDs well aligned with cooking habits
Section 3: TLUD Vs. Old Cookstove
Cookstove used before TLUD

- What cookstove did you use before you got the TLUD?

| Mudstove | 100% |
TLUD Vs. Old Cookstove

...Incidence of conversion

- **Do you continue to use the old cookstove?**

<table>
<thead>
<tr>
<th></th>
<th>Overall (N=43)</th>
<th>“Buy” Fuelwood (N=20)</th>
<th>“Collect” Fuelwood (N=22)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>53%</td>
<td>45%</td>
<td>64%</td>
</tr>
<tr>
<td>No</td>
<td>47%</td>
<td>55%</td>
<td>36%</td>
</tr>
</tbody>
</table>

- **How much of your cooking did you replace with the TLUD?**

<table>
<thead>
<tr>
<th></th>
<th>Overall (N=43)</th>
<th>“Buy” Fuelwood (N=20)</th>
<th>“Collect” Fuelwood (N=22)</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>47%</td>
<td>55%</td>
<td>36%</td>
</tr>
<tr>
<td>Most (75%)</td>
<td>49%</td>
<td>35%</td>
<td>64%</td>
</tr>
<tr>
<td>Half (50%)</td>
<td>4%</td>
<td>10%</td>
<td>0%</td>
</tr>
</tbody>
</table>

- **Total Conversion relatively higher among those who buy firewood; Those who collect firewood have replaced most of their cooking with the TLUD despite using the old cookstove**
TLUD Vs. Old Cookstove

…Advantages and Disadvantages of usage

- Do you see any advantages of using the Serval's TLUD over the old cookstove?

  Almost all of them mentioned “uses much less wood”, “No smoke”, “saves money”, “Easy to use”

- Do you see any disadvantages of using the Serval's TLUD over the old cookstove?

  Almost all of them mentioned “Vessels get black”

  Other comments – “Sometimes problem in starting, problem in high wind, ‘can’t cook in large quantities’

- Due to the updraft & generation of charcoal, light material flies up & get deposited - leading to more quenching effect on the cooking pot surface - resulting in blackening of the pot surface.

Offering a solution for vessel blacking and a Potskirt might be worth exploring
TLUD Vs. Old Cookstove

...Advantages and Disadvantages of fuelwood procurement

- In terms of procuring fuelwood for cooking, do you see any advantages of using the Serval's TLUD over the old cookstove?

  | Need to procure less wood |
  | No need to look for big sizes |
  | Can collect all kinds of waste wood |
  | Can pick up whatever I get |
  | Need to collect less wood, good in monsoons |
  | Easily available |

- In terms of procuring fuelwood for cooking, do you see any disadvantages of using the Serval's TLUD over the old cookstove?

  | Nothing in particular |

Fuelwood availability and sizing for TLUD not a problem
# TLUD Vs. Old Cookstove

### Advantages and Disadvantages of fuelwood procurement

<table>
<thead>
<tr>
<th>PARAMETERS</th>
<th>Baseline Data (Mudstove)</th>
<th>After one month of usage of TLUD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>WOOD</td>
<td>CD CAKES</td>
</tr>
<tr>
<td>MONTHLY CONSUMPTION ( KGs)</td>
<td>160</td>
<td>40</td>
</tr>
<tr>
<td>MONTHLY EXPENSE ON FIREWOOD (INR)</td>
<td>800</td>
<td></td>
</tr>
<tr>
<td>TIME TAKEN TO PREPARE 3 KG RICE (MINS)</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>TIME TAKEN TO PREPARE 200GM DAL (MINS)</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>TIME TAKEN TO PREPARE VEG (MINS)</td>
<td>45</td>
<td></td>
</tr>
<tr>
<td>TIME TAKEN TO PREPARE FISH (MINS)</td>
<td>75</td>
<td></td>
</tr>
<tr>
<td>TIME TAKEN TO PREPARE MEAT (MINS)</td>
<td>75</td>
<td></td>
</tr>
<tr>
<td>TIME TAKEN FOR FIREWOOD COLLECTION</td>
<td>40 HRS/MONTH</td>
<td>20 – 24 Hrs/month</td>
</tr>
</tbody>
</table>
The monthly consumption of wood per month has come down by 52%; a saving of 83 Kgs per month per household.

The monthly expense on firewood has come down by 55%; a saving of INR441 per month per household.

The time taken to cook reduces by about 50% on an average.

The time taken to collect firewood has come down by about 50%; frees up 20 hours per month for women/children per household.
TLUD Vs. Old Cookstove
... Fuelwood saving

Amount of Fuelwood used in a mudstove

Amount of Fuelwood used in the TLUD
The Charcoal Perspective

- What did you do with the charcoal that remains after using the TLUD?

  Almost all of them simply said: “I’ve kept it”

- Mass Education are willing to offer their infrastructure and “umbrella” for any downstream activity involving the char

  The charcoal being stored in the old cookstove

Charcoal : Looking for Direction
Willingness to Pay
Willingness to Pay

• People were willing to pay for the cookstove

• Which is the maximum price that you would be ready to pay for the TLUD?

  Average: INR 400 - 500

• The district level data from 2011 census reports say that the average household income level in the community is INR 4500 – 5000 per month
Summarizing the Results
Pilot Findings indicate high User Acceptance for Servals TLUD

- High levels of Satisfaction, likelihood to continue using and likelihood of recommending
- High levels of Satisfaction with product parameters, usage parameters and fuelwood procurement parameters
  - Wood saving and low smoke emerging as strong pluses
- Strong Value Perception perceived (50% saving in fuel, fuel costs, time to collect fuel)
- Incidental Socio-economic-environmental benefits perceived (Low smoke, frees up time for women for livelihood opportunities, frees up time for children for education)

Recap - Product meets expectations -

TLUD is a good fit for the biomass terrain and culinary culture of the community
Pilot Findings indicate that the community is well suited and deserving of a TLUD cookstove project

- High ‘delight’ levels indicate a community with low expectations. A community
  - Where appropriate technology has not percolated
  - Where transport systems discourage other cooking fuels
  - Where the need to reduce the drudgery of fuel collection and cooking is high.

- This is a mature biomass user community
  - That has ascended the biomass cooking learning curve
  - Has figured out the limitations of the gasifier and devised work-arounds

A community waiting to be served
As we see it
- Impact Balance sheet -

| For Serval | ● An opportunity to promote a cleantech
|           | ● An opportunity to create ‘energy entrepreneurs’ in line with their mission and business model
|           | ● An opportunity to offer the product to a deserving community by bridging the affordability gap through carbon finance |
| For Sapient | ● An opportunity to promote a cleantech, represent a world class product |
|            | ● An opportunity to catalyze economic activity in the community |
|            | ● An opportunity to offer an income generation activity to its project partners |
|            | ● An opportunity to build on the goodwill that it has in the community |
| For Mass Education | ● An opportunity to build on their mission around children education and women livelihood |
|            | ● An opportunity to improve the standard of living of the community they serve |
### As we see it - Impact Balance sheet -

<table>
<thead>
<tr>
<th>For Household</th>
</tr>
</thead>
<tbody>
<tr>
<td>● 50% fuel saving; 83 Kgs of wood saved per household per month</td>
</tr>
<tr>
<td>● 50% saving in fuel costs; INR440 per month</td>
</tr>
<tr>
<td>● 20 hours of time freed up every month for women and children</td>
</tr>
<tr>
<td>● Technology Up gradation from mudstove</td>
</tr>
<tr>
<td>● Lower Indoor Air Pollution</td>
</tr>
<tr>
<td>● Improved Well being</td>
</tr>
<tr>
<td></td>
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<tr>
<td>For the Community</td>
</tr>
<tr>
<td>● One tonne of CO2 saved per TLUD per household</td>
</tr>
<tr>
<td>● 83 Kgs of wood saved per household per month</td>
</tr>
<tr>
<td>● 150 Women Rural Energy Entrepreneurs created</td>
</tr>
<tr>
<td>● Prospective economic activity generated from Charcoal</td>
</tr>
</tbody>
</table>


The Bottomline

• There are many studies done in the unique eco-region of the Sundarbans pointing to the need for
  ➢ special policy measures to address ecological sustainability, distributional equity and well-being
  ➢ providing choices to the community to live the way they like and value what they have reason to value.

➢ The TLUD holds the promise to do a portion of all the above.

The TLUD Gasifier Cookstove
- Has the potential to improve the well-being index of Sunderbans -
- One kitchen at a time -
Thank You

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